

WHAT IS CLAIMED IS:

1. A laser module, comprising an external cavity including:

a semiconductor optical amplifier device having first and second end surfaces;

a grating fiber having an end and a diffraction grating; and

a lens for optically coupling the first end surface and the end together,

wherein an optical cavity length of the external cavity is in a range of 13 millimeters or more but 27 millimeters or less.

2. The laser module according to claim 1, wherein the end of the grating fiber is a lens-shaped end portion.

3. The laser module according to claim 1, wherein the diffraction grating of the grating fiber has a reflection spectrum, and

a full width at half maximum of the reflection spectrum is 0.4 nanometer or less.

4. The laser module according to claim 1, wherein the diffraction grating of the grating fiber has a reflection spectrum, and

an interval between adjacent longitudinal modes in the external cavity is within a full width at half maximum of the reflection spectrum.

5. The laser module according to claim 1, further comprising:

a mounting component which mounts the semiconductor optical amplifier device;

5 a lens holding member which is supported by the mounting component and holds the lens;

a ferrule which holds the grating fiber; and

a ferrule holding member which holds the ferrule and is supported by the mounting component,

10 wherein the grating fiber has a first portion provided with the diffraction grating, and a second portion of a pigtail shape.

6. The laser module according to claim 1, further comprising:

15 a mounting component which mounts the semiconductor optical amplifier device;

a lens holding member which is supported by the mounting component and holds the lens;

20 a ferrule which holds a fiber stub provided with the diffraction grating; and

a ferrule holding member which holds the ferrule and is supported by the mounting component.

7. A laser module comprising:

25 a semiconductor optical amplifier device having first and second end surfaces;

a grating fiber having an end and a diffraction

grating; and

a component-mounted member for configuring an external cavity by optically coupling the semiconductor optical amplifier device and the grating fiber together,

5            wherein the component-mounted member includes an abutting surface on which the end of the grating fiber is abutted,

the component-mounted member mounts the semiconductor optical amplifier device, and

10           an optical cavity length of the external cavity is in a range of 13 millimeters or more but 27 millimeters or less.

8.        The laser module according to claim 7,

15           wherein the end of the grating fiber is a lens-shaped end portion.

9.        The laser module according to claim 7,

wherein the diffraction grating of the grating fiber has a reflection spectrum, and

20           a full width at half maximum of the reflection spectrum is 0.4 nanometer or less.

10.       The laser module according to claim 7,

wherein the diffraction grating of the grating fiber has a reflection spectrum, and

25           an interval between adjacent longitudinal modes in the external cavity is within a full width at half maximum of the reflection spectrum.

11. The laser module according to claim 7,  
wherein the component-mounted member includes a  
first region and a second region which are provided along  
a predetermined axis,

5 the semiconductor optical amplifier device is  
mounted in the first region of the component-mounted  
member,

the grating fiber is mounted in the second region of  
the component-mounted member, and

10 the second region of the component-mounted member  
includes first and second supporting surfaces which support  
side surfaces of the grating fiber.

12. A laser module, comprising an external cavity  
including:

15 a semiconductor optical amplifier device having  
first and second end surfaces; and

a planar optical waveguide having an end and a  
diffraction grating,

20 wherein an optical cavity length of the external  
cavity is in a range of 13 millimeters or more but 27  
millimeters or less.

13. The laser module according to claim 12,  
wherein the diffraction grating of the grating fiber  
has a reflection spectrum, and

25 a full width at half maximum of the reflection  
spectrum is 0.4 nanometer or less.

14. The laser module according to claim 12,  
wherein the diffraction grating of the grating fiber  
has a reflection spectrum, and

5 an interval between adjacent longitudinal modes in  
the external cavity is within a full width at half maximum  
of the reflection spectrum.